PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

SUZUKI, Takako, et al.

Attorney Docket No.: Q67844

Divisional of Appln. No.: 09/322,978

Group Art Unit: 1752

Confirmation No.: Unknown

Examiner: Unknown

Filed: February 28, 2002

For: POSITIVE PHOTORESIST COMPOSITION AND PROCESS FOR FORMING RESIST PATTERN USING SAME

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Amend the specification by inserting before the first line the sentence:

This is a divisional of Application No. 09/322,978 filed June 1, 1999, allowed; the disclosure of which is incorporated herein by reference.

Please amend the specification as follows:

Replace the 2nd paragraph of Page 1 with the following paragraph:

Positive photoresist compositions comprising an alkali-soluble resin and a quinonediazide ester have been satisfactorily applied in practice for the production of semiconductor devices and liquid-crystal display devices, since they have excellent definition, sensitivity and etching resistance.

Replace the paragraph bridging pages 8-9 with the following paragraph:

FIG. 1 illustrates a developing process and locations for the evaluation of sensitivity on resist patterns in the examples of the invention;

IN THE CLAIMS:

Please cancel claim 5 without prejudice or disclaimer.

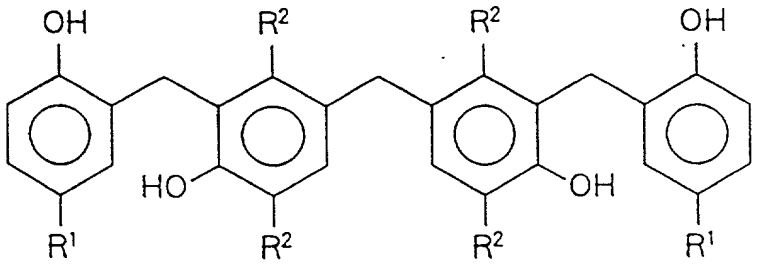
Please enter the following amended claims:

Please add the following new claims:

7 (new). A positive photoresist composition comprising

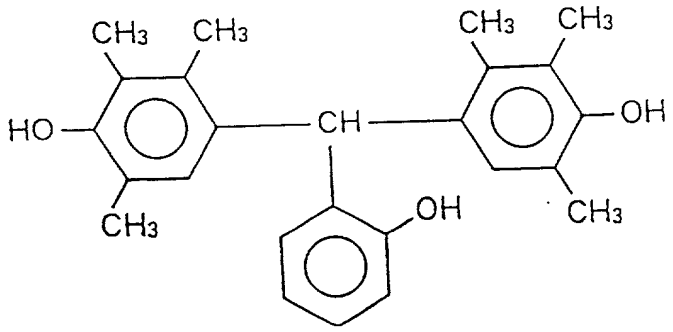
(A) an alkali soluble resin,

(B) a photosensitizer containing a quinonediazide ester of a compound of the following formula (I):



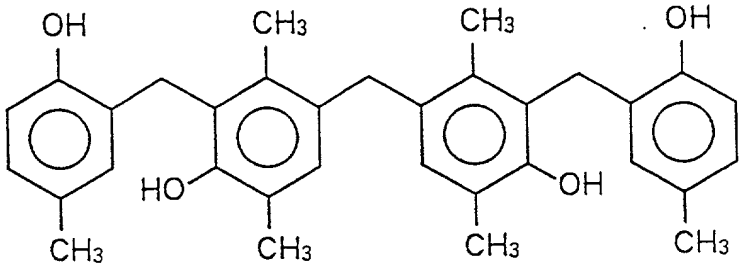
wherein each of R^1 and R^2 is independently a methyl group or an ethyl group, and

(C) at least one compound of phenol group-containing compounds having structural formula (C2) and having an elution time in the range from 6 to 30 minutes in high performance liquid chromatography, said high performance liquid chromatography being conducted under the following conditions: eluent: a mixed solvent of water:tetrahydrofuran:methanol = 40:24:36 (by weight); column: 4.6 mm (diameter) x 150 mm (length) containing 5 μm silica gel as a filler (carbon content being about 15%); column temperature: 45.0°C; and supply rate of eluent: 0.700 ml/min



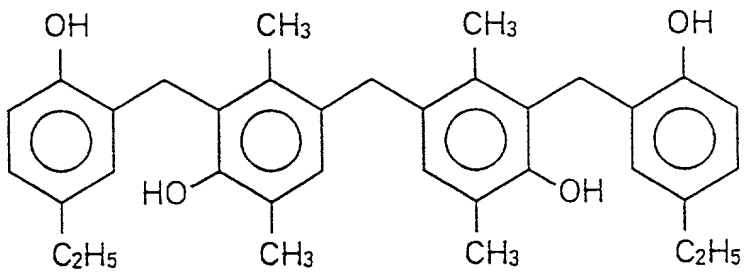
(c2)

8 (new). The composition according to claim 7, wherein said compound represented by the formula (I) is a compound of the following formula (Ia):



(Ia)

9 (new). The composition according to claim 7, wherein said compound represented by the formula (I) is a compound of the following formula (Ib):



(Ib)

10 (new). The composition according to claim 7, wherein the content of Ingredient (C) ranges from 5% to 50% by weight relative to Ingredient (A).

11 (new). A process for forming a resist pattern comprising the steps of:

(1) coating the positive photoresist composition of claim 7 onto a substrate having a diameter ranging from 8 to 12 inches, and drying the coated substrate to form a resist film,

(2) subjecting said resist film to selective exposure though a mask,

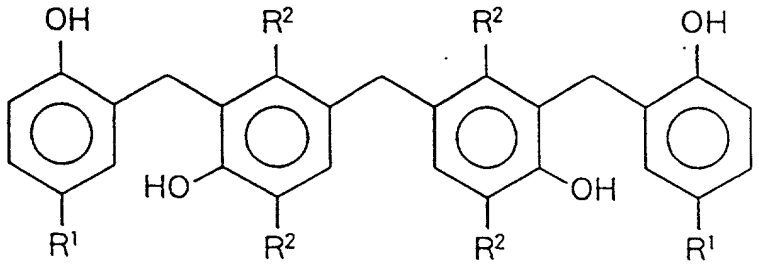
(3) heating said resist film, and

(4) removing the resist film at exposed positions by an aqueous alkali solution.

12 (new). A positive photoresist composition comprising

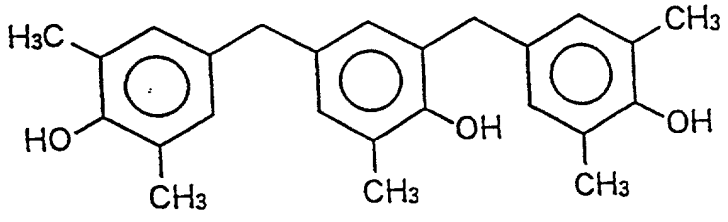
(A) an alkali soluble resin,

(B) a photosensitizer containing a quinonediazide ester of a compound of the following formula (I):



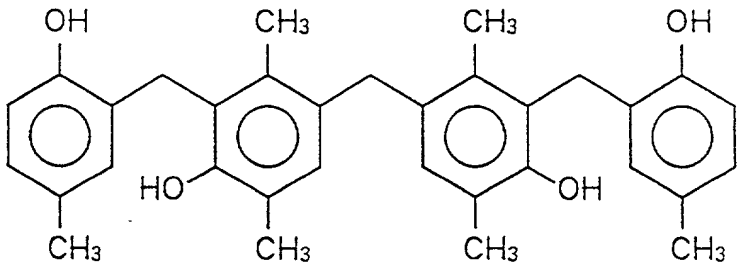
wherein each of R^1 and R^2 is independently a methyl group or an ethyl group, and

(C) at least one compound of phenol group-containing compounds having structure formula (C3) and having an elution time in the range from 6 to 30 minutes in high performance liquid chromatography, said high performance liquid chromatography being conducted under the following conditions: eluent: a mixed solvent of water:tetrahydrofuran:methanol = 40:24:36 (by weight); column: 4.6 mm (diameter) x 150 mm (length) containing 5 μm silica gel as a filler (carbon content being about 15%); column temperature: 45.0°C; and supply rate of eluent: 0.700 ml/min



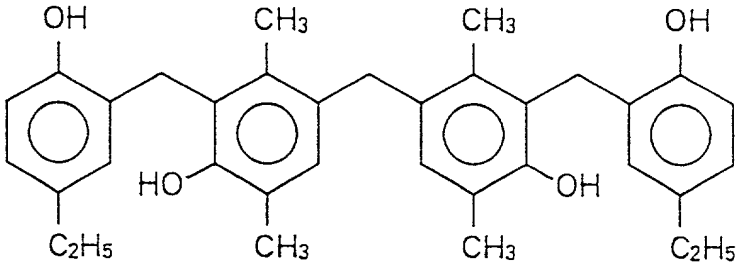
(c3)

13 (new). The composition according to claim 12, wherein said compound represented by the formula (I) is a compound of the following formula (Ia):



(Ia)

14 (new). The composition according to claim 12, wherein said compound represented by the formula (I) is a compound of the following formula (Ib):



(Ib)

15 (new). The composition according to claim 12, wherein the content of Ingredient (C) ranges from 5% to 50% by weight relative to Ingredient (A).

16 (new). A process for forming a resist pattern comprising the steps of:

(1) coating the positive photoresist composition of claim 12 onto a substrate having a diameter ranging from 8 to 12 inches, and drying the coated substrate to form a resist film,

(2) subjecting said resist film to selective exposure though a mask,

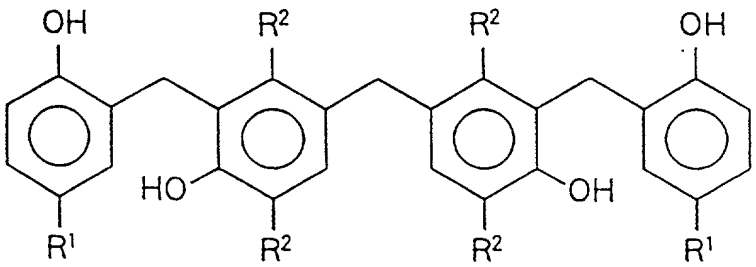
(3) heating said resist film, and

(4) removing the resist film at exposed positions by an aqueous alkali solution.

17 (new). A positive photoresist composition comprising

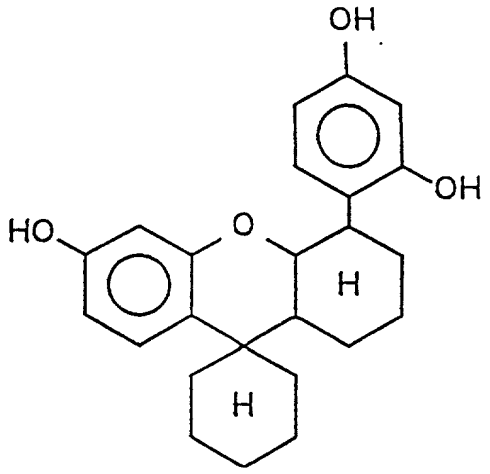
(A) an alkali soluble resin,

(B) a photosensitizer containing quinonediazide ester of a compound of the following formula (I):



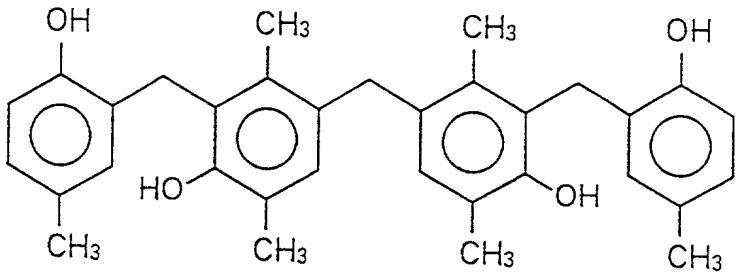
wherein each of R^1 and R^2 is independently a methyl group or an ethyl group, and

(C) at least one compound of phenol group-containing compounds having structural formula (C4) and having an elution time in the range from 6 to 30 minutes in high performance liquid chromatography, said high performance liquid chromatography being conducted under the following conditions: eluent: a mixed solvent of water:tetrahydrofuran:methanol = 40:24:36 (by weight); column: 4.6 mm (diameter) x 150 mm (length) containing 5 μm silica gel as a filler (carbon content being about 15%); column temperature: 45.0°C; and supply rate of eluent: 0.700 ml/min.



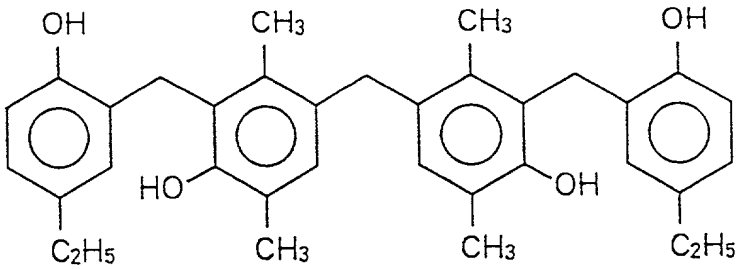
(c4)

18 (new). The composition according to claim 17, wherein said compound represented by the formula (I) is a compound of the following formula (Ia):



(Ia)

19 (new). The composition according to claim 17, wherein said compound represented by the formula (I) is a compound of the following formula (Ib):



(Ib)

21 (new). A process for forming a resist pattern comprising the steps of:

(1) coating the positive photoresist composition of claim 17 onto a substrate having a diameter ranging from 8 to 12 inches, and drying the coated substrate to form a resist film,

(2) subjecting said resist film to selective exposure though a mask,

(3) heating said resist film, and

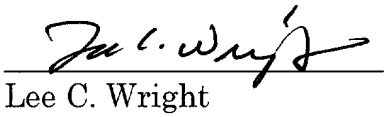
(4) removing the resist film at exposed positions by an aqueous alkali solution.

REMARKS

Entry and consideration of this Amendment is respectfully requested.

Additionally, filed concurrently herewith is a sworn translation of the foreign priority document.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Amend the specification by inserting before the first line the sentence:

This is a divisional of Application No. 09/322,978 filed June 1, 1999, allowed; the disclosure of which is incorporated herein by reference.

Page 1, 2nd paragraph, is changed as follows:

Positive photoresist compositions comprising an alkali-soluble resin and a quinonediazide ester have been satisfactorily applied in [practical to] practice for the production of semiconductor devices and liquid-crystal display devices, since they have excellent definition, sensitivity and etching resistance.

The paragraph bridging pages 8-9 is changed as follows:

FIG. 1 illustrates a developing process and locations for the evaluation of sensitivity on resist [patters] patterns in the examples of the invention;

IN THE CLAIMS:

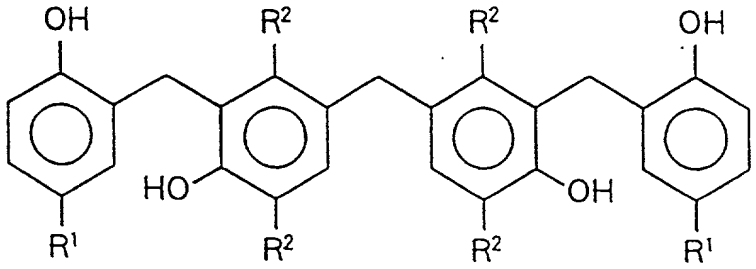
Claim 5 is canceled.

The claims are amended as follows:

1 (Amended). A positive photoresist composition comprising

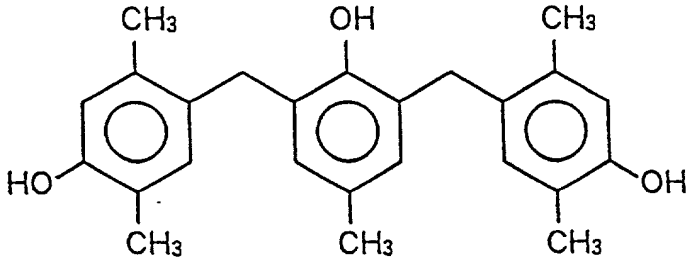
(A) an alkali soluble resin,

(B) a photosensitizer containing a quinonediazide ester of a compound of the following formula (I):



wherein each of R^1 and R^2 is independently a methyl group or an ethyl group, and

(C) at least one compound of phenol group-containing compounds having structural formula (C1) and having an elution time in the range from 6 to 30 minutes in high performance liquid chromatography, said high performance liquid chromatography being conducted under the following conditions: eluent: a mixed solvent of water:tetrahydrofuran:methanol = 40:24:36 (by weight); column: 4.6 mm (diameter) x 150 mm (length) containing 5 μm silica gel as a filler (carbon content being about 15%); column temperature: 45.0°C; and supply rate of eluent: 0.700 ml/min



(c1)

Claims 7-21 are added as new claims.